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Central Intelligence Agency

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DIRECTORATE OF INTELLIGENCE

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China: Beijing Raises Oil Production Targets

Summary

In contrast to increasingly pessimistic offshore drilling results by Western firms, China is portraying new optimism over its own onshore exploration program and its medium-term oil production prospects. We are not in a position to accurately predict output trends but, given Beijing's poor record of forecasting oil production, we are not confident that the current optimism is warranted. [redacted]

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New discoveries in the Shengli producing area at the mouth of the Yellow River offer some justification for higher short term production targets, as does what we judge to be a small increase in proven oil reserves last year. The country's largest fields, however, are reaching maturity and require large investments just to hold output constant. China's oil industry is benefitting from a large influx of Western technology and capital but it is far from clear what the payoff will be. [redacted]

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China's oil production peaked in 1979 at 106 million tons (2.12 million b/d), declined slightly through 1982, and has since increased to what will amount to about 110 million tons in 1984. This makes China the seventh-largest producer in the world, about the same as Venezuela and the United Kingdom.

This memorandum was prepared by [redacted] of the Development Issues Branch of the China Division, Office of East Asian Analysis. Questions and comments are welcome and may be addressed to the author [redacted]

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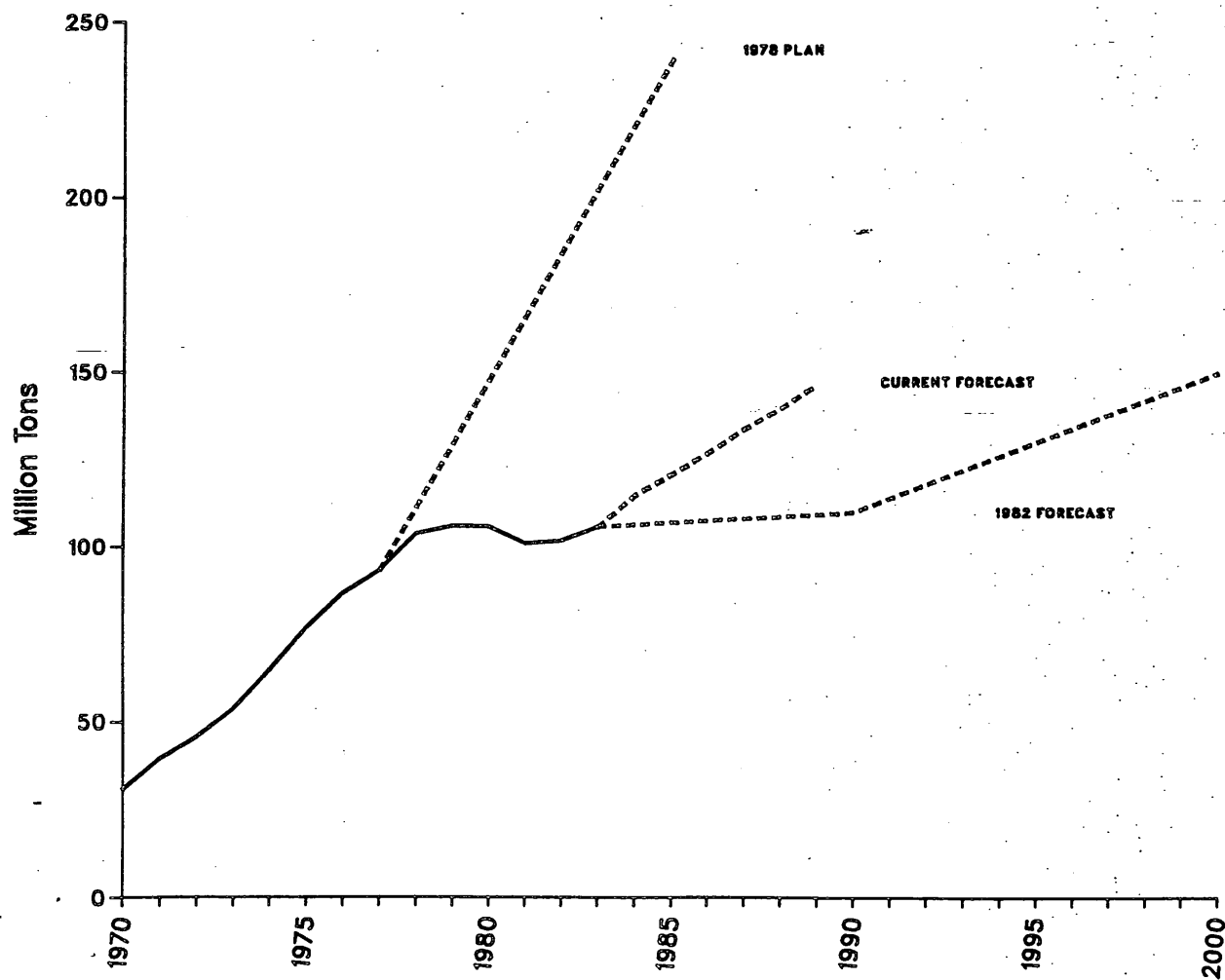
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China: Petroleum Output Plans



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Beijing earlier this year revised its medium-term oil production targets upwards, setting a goal of 5-percent annual growth through the 1980s. This would bring output to an annual rate of about 150 million tons by 1990. If such growth is achieved it would effectively eliminate any constraint that lack of oil might have on the economy and would allow Beijing to maintain its current level of oil exports. Beijing previously anticipated no growth until the late 1980s when offshore oil was expected to come on line and boost output to 150-200 million tons by the year 2000.

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A Question Of Reserves

Beijing has had a very poor record of forecasting oil production as is illustrated in figure ---. Much of the problem probably results from inadequate data on reserves. Beijing does not release official oil reserve statistics, and unofficial press reports--both Chinese and Western--are often very misleading. A common mistake by the press is to equate estimates of oil-in-place or "geologic" resources with proven, recoverable reserves. Usually only about a third to half of the oil-in-place in a given reservoir can be recovered. In 1981 an authoritative Chinese journal, Liaowang, published what appears to be the best reserve figures available. These are included in table 1 for 1980, the presumed year of record. Proven remaining reserves totaled 1.6 billion tons or between 11 and 12 billion barrels.

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NCNA, in mid 1984, released figures for new proven oil discoveries of 1.06 billion tons for the 1981-83 period and 570 million tons for 1983 alone. When depreciated by the same recovery factor used by Liaowang to determine recoverable oil reserves and netting out production, these figures show a slight decline in reserves in 1981-82 and a somewhat larger increase in 1983 to about 1.7 billion tons (12 billion barrels). Oil production totaled 774 million barrels last year so the reserves to production (R/P) ratio was about 15.6/1.

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This level of reserves relative to production is not necessarily a problem for a country such as China with large, relatively unexplored regions offshore and in its far west. The R/P ratio for the US in comparison is only 9/1. Two problems with China's reserves, however, make a significant increase in production difficult and a significant decline possible. First, probably about 20 percent of these reserves are in West China where lack of infrastructure constrains output particularly in the Qaidam and Tarim Basins. At least a decade of high-cost, intensive effort is required before any significant output can be obtained from these basins.

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Second, most of the reserves lie in fields already in mature stages of production, making maintenance of current production rates difficult. Nationwide, well productivity is declining at an annual rate of about 10 percent or about 10 million tons.

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Table 1
China: Estimated Oil Reserves

	billion tons ¹ (billion barrels)			
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
Oil-In-Place	6.8 (49.64)	7.04 (51.39)	7.29 (53.22)	7.86 (57.38)
Recoverable	2.3 (16.79)	2.38 (17.37)	2.47 (18.03)	2.66 (19.42)
Produced	.7 (5.11)	.80 (5.84)	.90 (6.57)	1.01 (7.37)
Reserves Remaining	1.6 (11.68)	1.58 (11.53)	1.57 (11.46)	1.65 (12.05)
Production	.105 (.77)	.101 (.74)	.102 (.74)	.106 (.77)
Reserves to Production (R/P)	15.2	15.6	15.4	15.6

¹ The decimal point is included in the reserve figures only to gauge the impact of the more accurate production figures. It is not intended to show the degree of accuracy of the reserves statistics which easily could vary by plus or minus 10%.

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This is being offset by drilling 2,000 new wells a year, thus increasing the density of wells in the oilfields. More ominously, 93 percent of production is obtained by injecting water into the oil reservoirs to push the oil out--usually a secondary recovery measure in the US. For the nation as a whole, probably more water is now recovered from the oil wells than is oil. In most fields, when this water-cut ratio reaches between 60 and 70 percent, oil output begins to drop rather sharply. [REDACTED]

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New Hope for Old Fields

The current optimism appears to stem from new discoveries in the Shengli producing area--first discovered in 1962 and currently accounting for about 20 percent of the nation's output. Hu Yaobang, for instance, in May stated there is a fair chance that Shengli's output will rise to 40 million tons by 1990, up from its current rate of 20 million tons per year. Some skepticism, however, appears in order. Erroneous forecasts for this area in the mid-1970s were probably the main reason why Beijing had to reduce oil projections sharply in 1978. The geology of the North China Basin, where Shengli is located, is very complex with many faults that can limit the size of reservoirs. Also, most of the oil is heavy and waxy, which complicates and reduces recovery. [REDACTED]

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Beijing has also expressed more optimism that Daqing--by far the country's most important field with 52 million tons or 50 percent of the nation's output--will be able to hold output steady until late in the 1980s. Daqing Oilfield, aided by a 1982 policy change that allows the field to sell above-quota oil at world market prices and by a \$160 million World Bank loan, is pumping large amounts of money into production facilities. Current strategy is to maintain the field's overall output rate by drilling more in-fill wells, importing hundreds of submersible pumps to increase fluid flow, and completing development of a deeper reservoir that will bring on line about 4 million tons of output by 1986. The Ministry of Petroleum also will probably receive over \$300 million in low-interest Japanese loans for development of two marginal fields in the Daqing area. [REDACTED]

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Analysis performed by Daqing Oilfield's Research and Planning Institute, published in a Chinese technical journal in July 1983, however, is not very optimistic. The analysis showed that the field's overall water-cut ratio had reached 64 percent by 1981 and would reach 75 percent by 1985 if the current 3-percentage point annual rate of increase in this ratio is maintained. Another article in February 1984 stated that the water-cut was close to 70 percent and that 25 percent of the field's original 3.5 billion tons of oil-in-place had already been recovered. The authors held out the possibility of pushing the water-cut up to 85 percent before allowing oil output to decline--about five years at the current rate. This would require a doubling of already pressed water injection and

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handling facilities. Clearly at some point the costs associated with handling this geometrically increasing volume of water will cause the oilfield to abandon the goal of level production. Moreover, the longer the field is pressed to maintain maximum production, the faster will be the decline. [REDACTED]

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The Offshore Strategy

The Ministry of Petroleum's general strategy--at least until the recent change in production targets--has been to put intensive efforts into keeping oil output steady in the country's northern and northeastern oilfields until offshore oil has a chance to come on line. Offshore oil is then expected to more than offset the decline of the onshore fields. [REDACTED]

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The offshore oil exploration program, however, has been slow in developing. The failure of a decade-long effort (1968-78) by the Ministries of Petroleum and Geology to find and develop offshore reserves led China to sign risk contracts with 30 Western and Japanese oil companies--a process completed only last year. The companies are to explore and develop five of the six major offshore basin complexes--only the East China Sea was excluded. The companies pay all exploration expenses--already well over \$1 billion--and will split development costs evenly with the Chinese. In return they hope to recover their costs with up to 50 percent of oil produced and earn a small profit share. Western geologists--after completing high-quality seismic analysis of the basins--have been very optimistic, estimating that they might find as much as 30 billion barrels of recoverable oil. [REDACTED]

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Early offshore results, however, have not been promising. The Japanese have achieved some success in the Bohai, but elsewhere--and especially in the most promising Pearl River Basin--only dry or noncommercial oil wells have been drilled. 1 Many prospects remain to be drilled and a second round of competitive bidding for new leases is expected next year. Several of the best locations, however, have already been drilled raising concern among the Chinese that the new bidding round will not be well received. [REDACTED]

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Continuing poor drilling results will have no impact on short-term production prospects unless Beijing feels obligated to conserve its resources. It will, however force a major reassessment of China's ability to increase oil in the 1990s in the face of an almost certain decline of Daqing. In that case, we believe Beijing would push forward exploration in frontier areas and in the East China Sea and in the meantime rethink its current oil export policies. [REDACTED]

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